WHAT IS CLAIMED IS:

1. A method of manufacturing an ink jet recording head which includes a plurality of nozzle orifices forming at least one nozzle row, pressure chambers each communicated with the associated nozzle orifice, pressure generating elements each generating pressure fluctuation in ink provided in the associated pressure chamber to eject an ink droplet from the associated nozzle orifice, the method comprising the steps of:

assembling the ink jet recording head;

measuring a natural period of the ink pressure fluctuation in the pressure chamber of the assembled recording head; and

classifying the assembled recording head into a plurality of ranks, based on the measured natural period.

2. The manufacturing method as set forth in claim 1, wherein the measuring step includes the steps of:

supplying an evaluation signal including at least an excitation element which excites the ink pressure fluctuation, and an ejection element which follows the excitation element to eject the ink droplet from the nozzle orifice;

measuring an ejected amount of the ink droplet at plural times while varying a time period between a termination end of the excitation element and an initial end of the ejection element; and

identifying the natural period based on a correlation between the time period and the measured ink amount.

3. The manufacturing method as set forth in claim 2, wherein the time interval includes at least:

a first time period which is determined such that the ejected ink amount becomes minimum when the natural period is as per a designed criterion;

a second time period which is shorter than the first time period; and

a third time period which is longer than the first time period.

4. The manufacturing method as set forth in claim 1, wherein the measuring step includes the steps of:

supplying an evaluation signal including at least an excitation element which excites the ink pressure fluctuation, and an ejection element which follows the excitation element to eject the ink droplet from the nozzle orifice;

measuring an ejected speed of the ink droplet at plural times while varying a time period between a termination end of the excitation element and an initial end of the ejection element; and

identifying the natural period based on a correlation between the time period and the measured ejection speed.

5. The manufacturing method as set forth in claim 4, wherein the time interval includes at least:

a first time period which is determined such that the ejection speed becomes minimum when the natural period is as per a designed criterion;

a second time period which is shorter than the first time period; and

a third time period which is longer than the first time period.

6. The manufacturing method as set forth in claim 2 or 4, wherein duration of the excitation element is equal to the natural period as per the designed criterion or less.

7. The manufacturing method as set forth in claim 6, wherein the duration of the excitation element is equal to one half of the natural period as per the designed criterion or less.

8. The manufacturing method as set forth in claim 1, wherein the plurality of ranks includes at least a first rank which indicates the measured natural period is as per a designed criterion, a second rank which indicates the measured natural period is shorter than the designed criterion, and a third rank which indicates the measured natural period is longer than the designed criterion.

9. The manufacturing method as set forth in claim 1, further comprising the step of indicating the classified rank on the assembled recording head.

10. The manufacturing method as set forth in claim 9, wherein the classified rank is indicated by a symbol.

11. The manufacturing method as set forth in claim 9, wherein the rank is determined with regard to the respective nozzle rows; and

wherein the rank is indicated by a symbol which indicates a combination of the classified ranks of the respective nozzle rows.

12. The manufacturing method as set forth in claim 9, wherein the classified rank is indicated by coded information which is readable by an optical reader.

13. The manufacturing method as set forth in claim 1, further comprising the steps of:

providing a memory; and

storing electrically information indicating the classified rank in the memory.

14. A method of driving the ink jet recording head manufactured by the method as set forth in claim 1, comprising the steps of:

providing a drive signal including at least one wave element having a control factor which is defined in accordance with the classified rank; and

supplying the drive signal to the pressure generating element.

15. The driving method as set forth in claim 14, wherein the drive signal is provided with an ejection element which ejects an ink droplet from the nozzle orifice and a damping element which follows the ejection element to damp vibration of a meniscus of the ink in the nozzle orifice; and

wherein a control factor of the damping element is defined in the drive signal provision step.

16. The driving method as set forth in claim 14, wherein the drive signal is provided with a characteristics changing element which changes ejection characteristics of the ink droplet; and

wherein a control factor of the characteristics changing element is defined in the drive signal provision step.

17. An ink jet recording apparatus, comprising:

an ink jet recording head, manufactured by the method as set forth in claim 1; and

a waveform controller, which provides a drive signal including at least one wave element having a control factor which is defined in accordance with the classified rank.

18. The recording apparatus as set forth in claim 17, wherein the drive signal is provided with an ejection element which ejects an ink droplet from the nozzle orifice and a damping element which follows the ejection element to damp vibration of a meniscus of the ink in the nozzle orifice; and

wherein the waveform controller defines a control factor of the damping element.

19. The recording apparatus as set forth in claim 17, wherein the drive signal is provided with a first drive pulse including:

a first expansion element, which expands the pressure chamber such an extent that an ink droplet is not ejected from the nozzle orifice;

a first ejection element, which follows the first expansion element to

contract the pressure chamber to eject an ink droplet from the nozzle orifice;

a holding element, which follows the first ejection element to hold the contracted state of the pressure chamber for a predetermined duration; and

a first damping element, which follows the holding element to expand the pressure chamber to damp vibration of a meniscus of the ink in the nozzle orifice; and

wherein the waveform controller defines the duration of the holding element.

20. The recording apparatus as set forth in claim 17, wherein the drive signal is provided with a second drive pulse including:

a second expansion element, which expands the pressure chamber to pull a meniscus of ink in the nozzle orifice toward the pressure chamber;

a second ejection element, which follows the second expansion element to contract the pressure chamber to eject a center portion of the meniscus as an ink droplet; and

a second damping element, which follows the second ejection element to expand the pressure chamber to damp vibration of the meniscus; and

wherein the waveform controller defines the duration of the second damping element.

21. The recording apparatus as set forth in claim 17, wherein the drive signal is provided with a third drive pulse including:

an ejection pulse, which ejects an ink droplet from the nozzle orifice;

a damping pulse, which follows the ejection pulse to damp vibration of

a meniscus of ink in the nozzle orifice; and

a first connecting element, which connects a termination end of the ejection pulse and an initial end of the damping pulse; and

wherein the waveform controller defines duration of the connecting element.

22. The recording apparatus as set forth in claim 17, wherein the drive signal is provided with a plurality of drive pulses for driving the pressure generating element and a second connecting element which connects a termination end of a preceding drive pulse and an initial end of a subsequent drive pulse; and

wherein the waveform controller defines duration of the second connecting element.

23. The recording apparatus as set forth in claim 17, wherein the drive signal is provided with a characteristics changing element which changes ejection characteristics of an ink droplet; and

wherein the waveform controller defines a control factor of the characteristics changing element.

24. The recording apparatus as set forth in claim 23, wherein the drive signal is provided with a fourth drive pulse including:

a first expansion element, which expands the pressure chamber such an extent that an ink droplet is not ejected; and

a first ejection element, which follows the first expansion element to

contract the pressure chamber to eject an ink droplet from the nozzle orifice; and

wherein duration of at least one of the first expansion element and the first ejection element is defined by the waveform controller.

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25. The recording apparatus as set forth in claim 23, wherein the drive signal is provided with a fourth drive pulse including:

a first expansion element, which expands the pressure chamber such an extent that an ink droplet is not ejected; and

a first ejection element, which follows the first expansion element to contract the pressure chamber to eject an ink droplet from the nozzle orifice; and

wherein a potential difference between an initial end and a termination end of at least one of the first expansion element and the first ejection element is defined by the waveform controller.

26. The recording apparatus as set forth in claim 23, wherein the drive signal is provided with a fifth drive pulse including:

a first expansion element, which expands the pressure chamber such an extent that an ink droplet is not ejected;

a first holding element, which follows the first expansion element to hold the expanded state of the pressure chamber; and

a first ejection element, which follows the first expansion element to contract the pressure chamber to eject an ink droplet from the nozzle orifice; and

wherein the waveform controller defines duration of the first holding element.

27. The recording apparatus as set forth in claim 23, wherein the drive signal is provided with a sixth pulse including:

a second expansion element, which expands the pressure chamber to pull a meniscus of ink in the nozzle orifice toward the pressure chamber; and

a second ejection element, which follows the second expansion element to contract the pressure chamber to eject a center portion of the meniscus as an ink droplet; and

wherein duration of at least one of the second expansion element and the second ejection element is defined by the waveform controller.

28. The recording apparatus as set forth in claim 23, wherein the drive signal is provided with a sixth pulse including:

a second expansion element, which expands the pressure chamber to pull a meniscus of ink in the nozzle orifice toward the pressure chamber; and

a second ejection element, which follows the second expansion element to contract the pressure chamber to eject a center portion of the meniscus as an ink droplet; and

wherein a potential difference between an initial end and a termination end of at least one of the second expansion element and the second ejection element is defined by the waveform controller.

29. The recording apparatus as set forth in claim 23, wherein the drive signal is provided with a seventh pulse including:

a second expansion element, which expands the pressure chamber to pull a meniscus of ink in the nozzle orifice toward the pressure chamber;

a second holding element, which follows the second expansion element to hold the expanded state of the pressure chamber; and

a second ejection element, which follows the second holding element to contract the pressure chamber to eject a center portion of the meniscus as an ink droplet; and

wherein the waveform controller defines duration of the second holding element.

30. The driving method as set forth in claim 14, wherein the plurality of ranks includes at least a first rank which indicates the measured natural period is as per a designed criterion, a second rank which indicates the measured natural period is shorter than the designed criterion, and a third rank which indicates the measured natural period is longer than the designed criterion.

31. The recording apparatus as set forth in claim 17, further comprising: a memory, which electrically stores information indicating the classified rank, the memory electrically connected to the waveform controller.

32. The recording apparatus as set forth in claim 17, further comprising:

a rank indicator, provided with the recording head to indicate the classified rank thereof so as to be optically readable; and

an optical reader, which optically reads the classified rank indicated by the rank indicator,

wherein the waveform controller acquires the classified rank read by the optical reader.

33. The recording apparatus as set forth in claim 17, wherein the pressure generating element is a piezoelectric vibrator.

34. The recording apparatus as set forth in claim 17, wherein the pressure generating element is a heating element.

35. A ink jet recording head, manufactured by the method as set forth in any one of claims 1 to 13.

36. The recording head as set forth in claim 35, wherein the pressure generating element is a piezoelectric vibrator.

37. The recording apparatus as set forth in claim 35, wherein the pressure generating element is a heating element.